

Analysis of partnership and conservation requirements for a threatened species, *Acipenser sturio* L., 1758: Towards the implementation of a recovery plan

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ABSTRACT

The Atlantic sturgeon *Acipenser sturio* L., 1758 is a threatened species whose last sanctuary is the Gironde, Garonne and Dordogne ecosystem. It has been strictly protected throughout France since 1981. However, no significant increase of its population has occurred. Until recently, as with the programme developed for salmon, migratory species restoration plans have mainly been centred on knowledge acquisition and the development of strictly technical programmes. These approaches are insufficient to integrate species survival requirements in environmental management.

The analysis of needs necessary for the recovery of Atlantic sturgeon suggests easily manageable technical aspects, providing proper means are available. On the other hand, far more complex social aspects of recovery can often interfere with the implementation of technical actions. As a matter of fact, aquatic ecosystem management deals with multiple actors, with different concerns and various competencies, which can directly or indirectly influence the achievement of a restoration programme. Motivating each group of actors and including them in a collective project is one of the ways to achieve the goals of a restoration programme.

Key words: Atlantic sturgeon, protection, recovery programme, France.

RESUMEN

Análisis de asociación y requisitos de conservación para una especie amenazada, *Acipenser sturio* L., 1758: hacia la puesta en práctica de un plan de recuperación

El esturión atlántico *Acipenser sturio* L., 1758 es una especie amenazada cuyo último santuario es el ecosistema Gironde, Garona y Dordoña. Se encuentra estrictamente protegido en Francia desde 1981. Sin embargo, no se ha producido un significativo incremento de esta población. Hasta recientemente, como con el programa desarrollado para el salmón, los planes de recuperación de las especies migratorias se han centrado principalmente en la adquisición de conocimiento y en el desarrollo de programas estrictamente técnicos. Estos enfoques son insuficientes para integrar los requerimientos de supervivencia de las especies en la gestión ambiental. El análisis de las necesidades requeridas para la recuperación del esturión atlántico sugiere aspectos técnicos fácilmente manejables, y las medidas apropiadas están disponibles. Por otro lado, aspectos sociales de recuperación más complejos pueden frecuentemente interferir con la puesta en práctica de acciones técnicas. Como un hecho natural, la gestión de los ecosistemas acuáticos trata con múltiples actores, con diferentes intereses y varias competencias, que pueden, directa o indirectamente, influir en la consecución del programa de recuperación. La motivación de todos los grupos de actores y su inclusión en un proyecto colectivo es una de las maneras de realizar los objetivos de un programa de recuperación.

Palabras clave: Esturión atlántico, protección, programa de recuperación, Francia.

INTRODUCTION

The Etablissement Public Interdépartemental Dordogne, or Epidor, is a stated-funded organization responsible for developing integrated procedures for managing the 475-km Dordogne River, one of France's largest waterways, and all of its tributaries throughout the extensive Dordogne basin. It was set up in 1991 by the local governments of the six *départements* –France's large counties–through which the Dordogne flows.

By co-ordinating each *département's* policies or projects for specific actions, Epidor develops overall management schemes for water, aquatic and adjacent habitats which have four main objectives: to restore water quality; to protect habitats and restore species; to achieve integrated management; to ensure respect for the environment.

In 1994, at the request of the French Ministry for the Environment, Epidor agreed to become involved in efforts to save the Atlantic sturgeon *Acipenser sturio* L., 1758. By approving this decision, the elected representatives on the *Conseils Généraux*, the six local governments to which Epidor answers, assumed their responsibilities as regards the threatened disappearance of a species which is of interest to all of Europe. Through their collective financial, technical and organisational commitment, they showed that the threat is not only a matter for the French State, scientists and local residents, but also an issue of general public concern. Epidor is now in charge of a European LIFE-Nature programme designed to this end, carried out jointly with scientists from the Cemagref institute in Bordeaux. A first phase of this programme was carried out during the period 1994-1997 (Anon., 1997). A second phase has been underway since 1998, and is scheduled to continue until the end of 2001 (Anon., 1998).

PRESENT STATUS OF STURGEON MANAGEMENT

As early as 1950, the French authorities had information which could have avoided the disappearance of sturgeon from the Garonne and Dordogne Rivers (Guerri and Pustelnik, 1995). Several documents blame over-fishing as the main cause for the increasing scarcity of the fish, along with large-scale poaching and lax legislation. A fur-

ther cause was dredging in the river beds, which led to the disturbance and even destruction of the spawning grounds.

It was not until 1982 that a measure for total protection of the species was implemented, based on scientific proposals, whereby its catch, transport and marketing are now forbidden throughout French territory. This protection was reinforced at the European level in 1992 by the European Community Habitat Directive, and in 1997 by classification of the species in Appendix II of the Bern Convention. But these measures still did not solve the problem of accidental catches in the course of other fishing activities (for shad, lamprey, etc.), or due to poaching.

Despite repeated demands made to the administrative authorities by the nature protection associations and fishermen (Guerri and Pustelnik, 1995), no protective measures have been made applicable to the lower reaches of the Garonne (80 km) or those of the Dordogne (135 km) or the Gironde estuary (680 km²) (figure 1). The argument advanced by the authorities for delaying the imple-

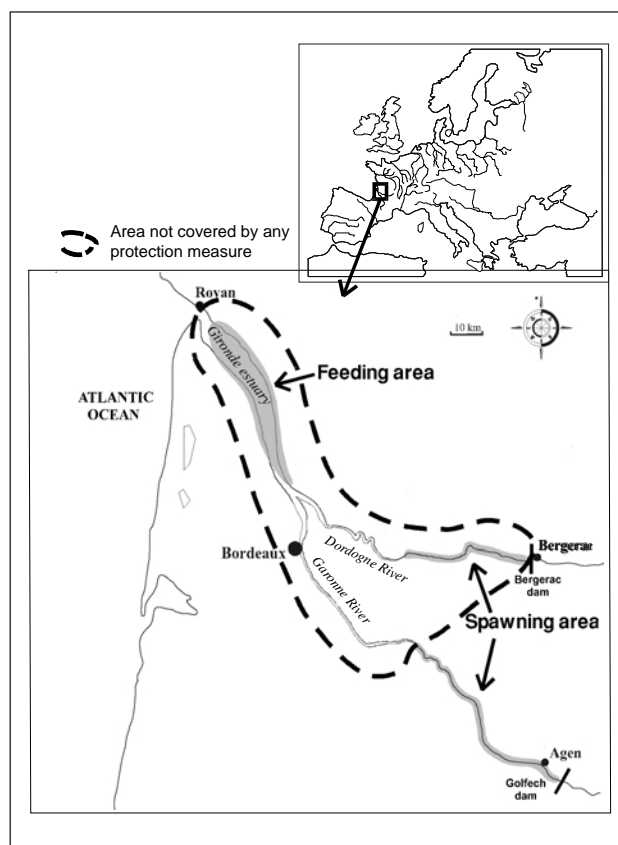


Figure 1. Habitat protection measures for *A. sturio* in the Gironde, Garonne and Dordogne basin

mentation of such measures rests on the alleged lack of accurate scientific information about the use of the various habitats by the different life stages of the sturgeon. This highly equivocal interpretation of the principle of precaution will result in the gradual elimination of many habitats. Indeed, approval and permits are still granted for the extraction of gravel and sand, whether for protected sectors or not, as well as for work or land use which will have serious consequences on the sturgeon's habitats.

Since 1990 the competent authorities have been provided with results containing all the elements required for the preparation of adequate measures

to protect the sturgeon. Tables I and II summarise the scope of actions engaged, comparing the knowledge acquired, the management measures obtained and those still needed. It shows that, even if incomplete, scientific data and technical capabilities are fundamental elements. But success in terms of concrete results for the sturgeon depends on what happens to these technical aspects and the way they are used in the management process.

Until 1994, fishing activities were managed by several local services of the French State: the *département's* offices of Agriculture and Forestry, Maritime Affairs, Maritime and Navigation Services, etc. French fishing law established a basis for

Table I. Habitat protection

Knowledge already acquired	Positive actions	Negative actions
Continued existence of areas of functional breeding (27 potential sites)	Upstream Garonne: 120 km upper reaches are protected	Permit delivered for channelling work 80 km lower reaches of Garonne unprotected
These areas are precarious and at risk from changes in the river bed		Dordogne not protected at all
Continued existence of feeding areas in the estuary specific areas frequented by 2-to-8-year-old sturgeon		No specific arrangements for protection of the estuary
These areas are precarious and at risk from changes caused by dredging		Authorization for gravel extraction currently valid
The Garonne and Dordogne are the last areas of functional breeding	International contacts made	

Table II. Population protection

Knowledge already acquired	Positive actions	Negative actions
The small size of the population	Protected species	Lack of means for policing throughout French territorial waters
Rarity of natural breeding	Population management chart Creation of conservation stock in captivity Development of methods and implementation of first re-stocking operation	
Strong impact on the population of mortality due to catching but low direct mortality due to accidental catches Survival depends on behaviour of the fishermen	Implementation of a monitoring and information plan for river, estuary and maritime fishing centres (underway at present)	
Stocks overlap the territory of at least 7 European countries	Classification of the sturgeon in Appendix I of the Habitat Directive and Appendix II of the Bern Convention	Lack of protection for the sturgeon in certain countries which signed the Habitats Directive and the Bern Convention

co-ordination and broader consultation which the defenders of the sturgeon could have expected to be a promising source of help -in the shape of the COGEPOMI, a committee for the management of migratory fish.

This committee brings together all the various kinds of fishermen, environmental associations, elected representatives (i.e. the county and municipal councillors), scientists and the river and maritime authorities. Its goal is to set up a management plan for migratory fish for each hydrographical river basin. Unfortunately, though, the sturgeon is not on the list of species covered by such plans. This follows a decision by the State Council (France's supreme legislative watchdog) that since the sturgeon is a protected species, it has no need of the management measures.

As a result, there is no operational and strategic body in which collective discussions can take place on the future of the sturgeon, and, above all, with the people principally involved, the fishermen, who are held responsible for the catching of specimens (whether accidentally or not). Paradoxically, then, the sturgeon is penalised by its very status as a protected species.

Furthermore, the moves to save the sturgeon have revealed serious limitations in the French authorities' ability to act in the field of environmental conservation. There are, for instance, considerable difficulties over collaboration between the Ministry for the Environment (highly motivated to save the sturgeon), whose powers are confined to rivers, and the Ministry for Agriculture and Fisheries, in charge of the maritime areas but far less concerned about the protection of species.

This has led to actions which are sometimes contradictory, resulting in considerable pressure on the fishermen to reduce activities in the river and estuary areas, while leaving relative freedom for activities in the maritime areas. In addition, there is a tremendous disparity between the policing resources allotted to control of activities and respect for legislation. They are present (albeit weak) in the river areas, but are practically non-existent in the estuary and maritime areas. This situation, added to a general lack of resources allocated to protection of the environment, explains why it is impossible for State authorities to play a significant role in promoting actions to save the sturgeon.

At present, therefore, it is paradoxically the non-governmental partners who, though having no powers nor legal obligations, are making the most energetic efforts to save the sturgeon. These actions are initiated by researchers, local authorities and certain associations or social-economic partners who are committing themselves to a project without any long-term guarantees.

A STRATEGY TO SAVE THE STURGEON

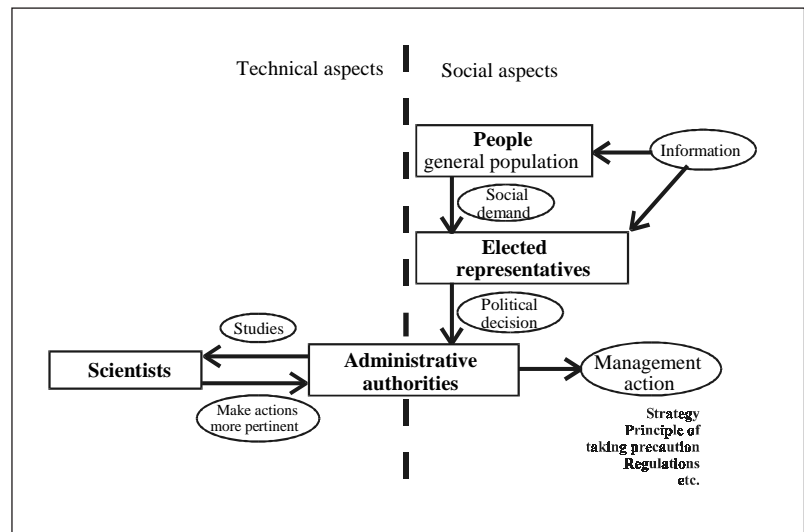
Fifteen years after publication of the ministerial decree banning fishing of this species, the sturgeon population remains seriously depressed. The framework, principles and means of managing *A. sturio*'s requirements have not worked. The sturgeon is the victim of its biological inability to survive easily in the same environment as man (e.g. such factors as its late maturity, that it inhabits estuaries and low valleys which are sensitive habitats, and that it is easily caught by fishing tackle).

Setting up methods and operational technical action takes time and resources. The sturgeon is in a situation where the only way to guarantee it acceptable conditions for survival is to take certain of its needs into account immediately.

During the first phase of the LIFE programme (Anon., 1997), all-encompassing investigations were undertaken to design a strategy to enhance the involvement of those concerned in the efforts to save the sturgeon. This analysis resulted in three main lines for action:

- (1) The sturgeon has been disappearing for the past 40 years; those rightly responsible for management processes affecting the species must now become truly involved and set up a suitable organization to put research efforts to use, turning them into operational management tools. To this end, stable, long-term funding must be secured, so as to support the indispensable scientific and technical operations and, above all, set up the essential organizational resources. In any democratic process (figure 2), it is up to the elected representatives and then the relevant authorities to decide on these steps. Pressure from the public will increase their commitment.
- (2) Management of time is necessary in order to mobilise the people involved and to ensure

Figure 2. The mechanism of democratic management



the sturgeon does not disappear during that same period. Having seen how far the situation of the sturgeon species has deteriorated, how sluggish the management system is, and how the biology of the species permits only a very slow reinstatement of the population, it is essential to combine urgent action with others over the long term.

- (3) The sturgeon is a major migrating species, ranging over distant territories where its survival can likewise be threatened. The problem of saving it must therefore be tackled at several levels, to ensure its conservation not only in local management situations, but also on the national and international plane.

The strategy proposed thus defines three priority target publics: the general public; their elected representatives, whose job it is to orient, decide and finance management policies; and the fishermen, because they are directly involved in day-to-day contact with the sturgeon. It can be assumed that members of the public, provided they are properly informed and made aware of the needs, will be anxious for their elected representatives to do something about saving the sturgeon. They will ask them to allocate all the resources needed for the project to succeed –that is, funding for programmes and indications of the guidelines for those who manage the situation.

Common sense and government responsibility have not been enough to ensure the sturgeon's survival. To start the debate all over again and decide what arguments should be put forward, it is necessary to establish the present-day social con-

text and to identify the areas to which the people involved are sensitive when an ecological problem is being dealt with. Discussions during the first phase of the LIFE programme enabled several messages to be identified, which it has been possible to develop in the context of the sturgeon situation.

Several new and somewhat theoretical concepts have been adopted as starting-points for drawing up different schemes to inform people about the sturgeon. These relate to economics, the culture of fishing, maintenance of biological diversity, and sustainable development.

- (1) Sturgeon used to make a significant contribution to the economy along the banks of the Gironde. Rebuilding a sustainable population is such a long-term and hypothetical question that it is totally impossible to consider realistic economic benefits from the fish.
- (2) The culture of sturgeon fishing is reserved for certain knowledgeable practitioners and is tending to disappear at the same speed as the sturgeon themselves.
- (3) The concept of biological diversity is highly scientific, and one which many people sometimes find difficult to understand.
- (4) Because the sturgeon is rare and somewhat a creature of mystery, it has come to be an emblem and indicator of quality, its survival demonstrating the health of the habitat. It is this emblematic image of sustainable development, in a territory (river and estuary) known to be subjected to very considerable developmental pressure,

which has emerged as the most appropriate for gaining the attention of everyone who needs to be involved with the problem.

Based on all these elements, the LIFE programme has selected various distinct but complementary actions which address public awareness, communications, training, and advisory services. Some of these are detailed below.

A “Save the sturgeon” exhibit

This is a modular exhibit which presents the biology of the sturgeon, its life history, the main reasons for its disappearance (and those to blame for them). It involves the visitors by asking them to sign a petition, after first showing them what work is already in hand. A more mobile version of this exhibit has been designed in order to reach less centralised areas, schools and other small centres.

A documentary press file

Designed in collaboration with a magazine, the file contains interviews with fishermen, elected representatives and scientists, compiles key points of the information currently available, and present an overview of the whole problem of the disappearance and reinstatement of the sturgeon.

An educational pack

With the long term in mind, a pack for schools has been drawn up with professionals from France's national education system. It presents both teachers and pupils with an appropriate file on the sturgeon and the problem of the fish's threatened disappearance.

A competition

Under the catchy title of “The *A. sturio* affair”, a competition for schools is being prepared on the Internet, with prizes for entrants who carry out the best investigations. The idea will be for children to scan the Web sites of bodies participating in the restoration project and seek out information concerning the causes and responsibilities for the sturgeon's disappearance.

A poster

Designed for display in public places frequented by fishermen (ports, fish auctions, co-operatives, maritime banks, etc.), the poster has already been distributed on the entire French coast. It gives the basic information needed to tell fishermen how to recognise the species, its status as a protected species, and what to do if they catch one. Several other documents (stickers, desk pads) are destined to accompany a second information campaign, which will be run by a person involved with organising activities in the field.

A database

It will be available on the Internet and will cover all the areas of information (historical, official and other texts, images, etc.) collected during the programme. The aim is to have a ready-made network of information available for future partners in the field of sturgeon protection.

A network of Web sites

This will be devoted to the sturgeon, permitting quicker exchanges of information between all the specialists involved.

Even taken together, all of these tools are obviously inadequate and cover only part of the needs identified in the strategy. They do, nevertheless, bring together the data required to inform the general public and schools in a simple and attractive form. They also make it possible for the media to access the essential information.

A tremendous effort is still required in this field and there is a need to investigate other means for motivating the general public, elected representatives, administrations and fishermen. Included among these other means are: setting up a permanent information site on the Gironde estuary; making media reports or setting up events at national level; and developing associations and information teams in the field.

DISCUSSION

One of the strategic aspects which should help progress for preserving the future of the sturgeon

is based on the development of national and international mobilization. Until now, the question of the Gironde sturgeon has remained a very local concern. A first step has been taken in the launch of a European programme involving the European Commission, the national authorities (Ministry for the Environment), local authorities in the Garonne/Dordogne basin, the scientific community, and local associations. The establishment of an international scientific committee under the LIFE programme has made it possible to kick off the process of broadening the outlook for discussions about the sturgeon. The second phase of the LIFE programme takes this one step further by preparing restoration strategies for implementation at the international level, by means of enquiries in the major European drainage basins.

Care must be taken to involve all of the population segments concerned in these procedures in addition to the specialists and official bodies. Decision makers at all levels must be mobilised, in order to provoke positive interactions which would arise from the collective involvement of elected representatives in the various countries concerned. An example would be the creation of an international commission for the conservation of the European Atlantic sturgeon, along the same lines as that which is already in operation for the North Atlantic salmon (Anon., 1999). Its mandate would make it possible to initiate all of the appropriate debates at the right pan-European level and to propose to the member countries –with all the strength of an international body behind it– the lines along which organisation or action could be taken to enable significant progress.

As pointed out earlier, because the sturgeon is a protected species, it is excluded in France from discussions concerning the management of migratory fish. But its problems are not basically any different from those of other migratory species, such as the salmon, eel or river lamprey, which are also suffering difficulties. These species are most often victims of the same phenomena and suffer from the same disturbances: over-fishing, deteriorating habitat, etc. Thus, it would be advantageous to avoid dealing with the management of migratory species separately.

Comprehensive management of all migratory species would obtain savings in terms of economy of scale and ensure that species which receive less attention, because they are less well-known or less

interesting economically, could benefit from the efforts invested for the more profitable species. This would at least bring the sturgeon back into the debates in those bodies which manage the habitats and practices, notably fishing, but at present have no real mandate for discussing this particular fish. It would put an end to the paradoxical situation whereby, of the eight species of migratory fish in the Dordogne basin, the sturgeon is the one least taken into account in management of the waterways –yet it is precisely the one for which the study programmes and technical follow-up are the best designed and best co-ordinated. This proposed global effort does not preclude more specific work but encourages co-ordination.

In the Dordogne region, work is progressing to establish such an overall management strategy, named *Objectif Retour aux Sources*, for migratory fish at a river-basin scale, and a similar process is being developed for the Garonne. This integrates eight fresh- and salt-water migratory species into the same collective programme, which is the subject of considerable consultation work and a strong desire to mobilise the general population. It is hoped by these means to construct a coherent project including the sturgeon, not just for the sturgeon.

CONCLUSIONS

Whereas the question of specific knowledge is for the scientists, the question of overall conservation is one for society as a whole. It has been suggested that governments and the different bodies involved in political, management and financial decisions, should develop a social charter for migrating fish which could be based on recognition that the management of migratory fish is one of the elements in integrated management procedures for rivers, and agreement on the fact that coherent strategies must be developed at local, national and international levels. The value of active and direct participation in the management of migratory fish would be enhanced by: initiating the establishment of management strategies at hydrographical river basin levels; checking that all the species are taken into account in the strategies developed; assuring that these strategies are supported by international bodies for the conservation of species; identifying the various local contacts involved and associating them with

the project right from the beginning; ensuring that procedures for consultation, agreement and negotiation are implemented with the people and their representatives; and increasing financial investments in order to make all the above possible.

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